



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US86/00486 <b>(22) International Filing Date:</b> 10 March 1986 (10.03.86) <b>(31) Priority Application Number:</b> 709,965 <b>(32) Priority Date:</b> 11 March 1985 (11.03.85) <b>(33) Priority Country:</b> US  <b>(71) Applicant:</b> A. E. STALEY MANUFACTURING COMPANY [US/US]; 2200 East Eldorado Street, Decatur, IL 62525 (US). <b>(72) Inventor:</b> MALIK, Arshad, H. ; 56 Ridge Lane Drive, Decatur, IL 62521 (US). <b>(74) Agents:</b> CAMPBELL, Michael, F.; A. E. Staley Manufacturing Company, 2200 East Eldorado Street, Decatur, IL 62525 (US) et al.		<b>(81) Designated States:</b> BE (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, NL (European patent), SE (European patent).  <b>Published</b> <i>With international search report.</i> <i>With amended claims.</i>
<b>(54) Title:</b> DISINFECTANT AND/OR SANITIZING CLEANER COMPOSITIONS  <b>(57) Abstract</b>  Liquid disinfectant and/or sanitizer cleaning compositions in the form of homogeneous aqueous solutions which comprise water, a germicidal quaternary ammonium halide compound and a glycoside surfactant and in which the weight ratio of the quaternary ammonium halide compound to the glycoside surfactant is at least 0.65:1. Such compositions may also optionally include additional ingredients such as water soluble detergent builders, water miscible organic solvents, hydrotropes, perfumes, dyes, colorants, thickeners, soil suspending agents, deodorizers, ammonia, aerosol propellants and the like.		

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DISINFECTANT AND /OR SANITIZING CLEANER  
COMPOSITIONSBACKGROUND OF THE INVENTION

The present invention pertains to aqueous  
5 disinfectant and/or sanitizing cleaning compositions  
containing a germicidal quaternary ammonium halide  
compound and a glycoside surfactant material and to the  
use of such compositions for disinfecting and/or  
sanitizing surfaces, articles, etc. contaminated with  
10 undesired bacterial, fungal and/or viral organisms.

Alkyl glycoside materials such as, for example,  
higher alkyl monoglycosides and higher alkyl  
polyglycosides are known materials; are known, at least  
in certain circumstances, to function as nonionic  
15 surfactants; and have been suggested as being suitable  
for use in certain specially formulated detergent compositions.  
See in this regard, for example, Published  
European Patent Application Numbers 0070074; 0070075;  
0070076; and 0070077, all of which published on January  
20 19, 1983 as well as Published European Patent Application  
Numbers 0075994; 0075995; and 0075996 which published  
on April 6, 1983. See also Published European  
Patent Application Number 0105556 (published April 18,  
1984) which discloses liquid detergent compositions  
25 containing anionic surfactants, alkylpolyglycoside  
surfactants, selected nonionic surfactants and optionally  
also containing various other ingredients such as suds  
stabilizing amine oxide surfactants, detergent builder  
materials, and the like; Published European Patent  
30 Application Number 0106692 (published April 25, 1984)  
which discloses stable heavy-duty liquid detergent  
compositions containing a mixture of an ethoxylated fatty  
alcohol nonionic surfactant, an alkylpolyglycoside

surfactant and a quaternary ammonium cationic surfactant in conjunction with a polyethylene glycol compound and a  
5 wide variety of optional conventional laundry detergent additives; and U. S. Patent 4,493,773 (issued January 15, 1985) which discloses laundry detergent compositions which contain a conventional nonionic detergent surfactant, an alkylpolyglycoside detergent surfactant  
10 and a quaternary ammonium cationic fabric softening surfactant and which are said to be capable of including a wide variety of conventional laundry detergent additives such as relatively small amounts of detergent builders, detergency cosurfactants such as trialkyl amine  
15 oxides, solvents such as ethanol, and the like.

A relatively specialized category of cleaning composition of interest to the art is one which is often referred to as a liquid detergent hard surface cleaning composition and which is specifically designed or formulated  
20 such that it can be applied to a soiled hard surface of interest (e.g., glass, painted walls, woodwork, etc.) and removed therefrom (for example as by wiping with a dry or damp cloth) without a subsequent rinsing operation and without leaving a significant  
25 or unsightly residual film upon the surface after cleaning. Thus, for example, in Published South African Patent Application No. 666,781 there is described a hard surface cleaner composition which comprises from 1-10% of an anionic surfactant (e.g., alkyl sulfate or alkyl aryl  
30 sulphonate) or a nonionic surfactant (e.g., an ethylene oxide condensate of a fatty alcohol or of an alkyl phenol) and at least 20% of a 1:1 to 4:1 ratio mixture of an alkali metal (or ammonium) borate and sodium carbonate and

which, at a 1% concentration in water, has a pH of at least 9.6.

5           On the other hand, U. S. Patent 3,591,510 to William Edward Zenk (issued July 6, 1971) describes certain liquid hard surface cleaning compositions consisting essentially of from about 0.25 to 4% of certain selected anionic or zwitterionic detergents; from about  
10   0.5 to about 6% of certain water soluble builder components; from about 1 to about 10% of certain selected organic solvents or solvent mixtures; and the balance being water.

15           In a recent journal article, namely "A Greasy Soil Hard Surface Cleaning Test: by Morris A. Johnson, JAOCS, Vol. 61, No. 4, pages 810-813 (April 1984), a series of commercially available solvent-based and water-based cleaners were tested for greasy soil removal effectiveness at various dilution ratios.

20           Hard surface cleaning formulations are also discussed in "Formulation of Hard Surface Spray Cleaners" by R. E. Johnson and E. T. Clayton, detergents and specialties, June 1969, pages 28-32 and 56. Formulations discussed in such article included (a)  
25   one which was composed of 1 weight percent of a non-ionic surfactant (linear alcohol ethoxylate), 2.5 weight percent of anhydrous tetrapotassium pyrophosphate (builder), 5 weight percent of ethylene glycol monobutyl ether (solvent) and the balance water and (b) another  
30   which was the same as the former except that the indicated nonionic surfactant was replaced with a corresponding amount of a linear alkylbenzenesulfonate anionic surfactant. In said article, it is noted that the

5      aforementioned nonionic surfactant-based formulation exhibited slightly more filming (i.e., being given a "moderate" film rating) than its corresponding anionic surfactant-based counter-part (which obtained a "moderate-good" film rating).

10      In U. S. Patent 4,065,409 to John J. Flanagan (issued December 27, 1977), there are disclosed certain liquid detergent compositions which comprise aqueous solutions containing certain selected ethoxylated nonionic surfactants in combination with certain amine oxide and quaternary ammonium halide surfactant components. Such compositions are described as being useful as hard  
15      surface detergents for cleaning surfaces such as painted wood, plaster or wall board; tile; glass; metal; linoleum and the like. The combination of the three surfactant ingredients indicated above is said to exhibit improved detergent properties relative to those exhibited by  
20      compositions containing any one or two of said ingredients at equivalent concentrations.

25      In U. S. Patent 4,174,304 to John J. Flanagan (issued November 13, 1979), surfactant systems comprising, in certain specified proportions, a combination of certain ethoxylated nonionic, amine oxide and quaternary ammonium halide surfactant components are described as being suitable, in combination with certain other specified ingredients (such as antifoaming agents, water softening agents, viscosity reducing agents, builders  
30      and the like) in the preparation of a wide variety of commercially useful cleaning formulations such as, for example, degreasing cleaner compositions; wax and floor

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finish stripper compositions; glass and smooth surface cleaning and polishing compositions; and the like.

5           The development, evaluation and Environmental Protection Agency (EPA) labeling requirements for cleaner disinfectant compositions such as, for example, those containing quaternary ammonium halide compounds, nonionic detergents and detergent builder ingredients  
10 are discussed in an article entitled "Formulating Quaternary Cleaner Disinfectants to Meet EPA Requirements" by Donald F. Greene and Alfonso N. Petrocci, SOAP/COSMETICS/CHEMICAL SPECIALTIES, August 1980, pages 33-35 and 61.

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SUMMARY OF THE COMPOSITIONS OF THE INVENTION  
AND THE METHODS OF USING SAME

5           It has now been discovered that glycoside  
surfactants can be suitably employed as the nonionic  
surfactant component in aqueous disinfectant or sanitizer  
cleaning compositions of the sort mentioned in the  
above-identified article by Greene and Petrocci.  
10   Additionally, it has also been discovered that glycoside  
surfactants are particularly effective in such composi-  
tions when ethylene diamine tetraacetic acid or alkali  
metal salts thereof are employed as a detergent builder  
ingredient.

15           Accordingly, the present invention, in one  
aspect, is a liquid disinfectant and/or sanitizer cleaning  
composition which, on a total composition weight basis,  
comprises:

- 20           a. from about 0.01 to about 50 weight per-  
cent of a germicidal quaternary ammonium  
halide compound;
- 25           b. from about 0.01 to about 50 weight per-  
cent of a glycoside surfactant; and
- 30           c. from about 10 to about 99.98 weight  
percent water; and in which the weight  
ratio of the quaternary ammonium halide  
compound to the glycoside surfactant is at  
least about 0.65:1 (preferably at least  
about 0.8:1).



Such compositions may also optionally include:

- 5           1. from 0 to about 50 weight percent of a water soluble detergent builder;
2. from 0 to about 50 weight percent of a water miscible organic solvent; and
- 10          3. from 0 to a total of about 50 weight percent of one or more discretionary ingredients selected from the group consisting of hydrotropes, perfumes, dyes, colorants, thickeners, soil suspend-  
15           ing agents, deodorizers; ammonia, antioxidants, and aerosol propellants.

The disinfectant and/or sanitizer cleaning composition of the present invention can, if desired, suitably take the form of a dilutable liquid concentrate  
20 for the purposes of its convenient and economical initial manufacturing or formulation operations, transport or distribution, and/or marketing and can then be subsequently diluted (e.g., by the final distributor or the ultimate user) with water prior to its ultimate use in  
25 cleaner/sanitizer or cleaner/disinfectant end-use applications.

In their aforementioned concentrated form, the compositions of the present invention will typically comprise, on a total concentrate composition weight  
30 basis:

- a. from about 10 to about 50 (preferably from about 10 to about 30) weight percent

of the germicidal quaternary ammonium halide compound;

5

b. from about 10 to about 50 (preferably from about 10 to about 30) weight percent of the glycoside surfactant;

10

c. from about 10 to about 80 (preferably from about 20 to about 70 and more preferably from about 30 or 40 to about 50 or 60) weight percent water; and

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d. optionally, up to about 50 (preferably up to about 30) weight percent of a water soluble detergent builder; up to about 50 (preferably up to about 30) weight percent of a water miscible organic solvent; and/or up to a combined total of about 50 (preferably up to a combined total of about 30) weight percent of one or more of the above-noted discretionary ingredients.

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When the foregoing compositions are diluted to their ready-to-use form (i.e., for their intended cleaning/disinfecting or cleaning/sanitizing purposes), they will typically contain, on a total composition weight basis:

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a. from about 0.01 to about 10 (preferably from about 0.01 to about 5, more preferably from about 0.02 to about 3 and most preferably from about 0.02 to about

1.5) weight percent of the germicidal quaternary ammonium halide compound;

5

- b. from about 0.01 to about 10 (preferably from about 0.01 to about 5, more preferably from about 0.02 to about 3 and most preferably from about 0.05 to about 1.5) weight percent of the glycoside surfactant; and

10

- c. from about 50 to about 99.98 (preferably from about 70 to about 99.98, more preferably from about 75 to about 99.96 and most preferably from about 90 to about 99.93) weight percent water.

15

The above described diluted compositions can, if desired, also optionally include, on a total composition weight basis;

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1. from 0 to about 10 (preferably from 0 to about 5 and more preferably from 0 to about 3) weight percent of a water soluble detergent builder;

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2. from 0 to about 10 (preferably from 0 to about 5 and more preferably from 0 to about 3) weight percent of a water miscible organic solvent; and

30

3. from 0 to about 10 (preferably from 0 to about 5 and more preferably from 0 to about 3) weight percent of one or more

5 discretionary auxiliary ingredients  
selected from the group consisting of  
hydrotropes, perfumes, dyes, colorants,  
thickeners, soil suspending agents,  
deodorizers, ammonia, antioxidants and  
aerosol propellants.

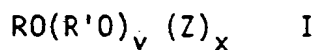
10 In one of its aspects, the present invention is  
also a method for cleaning and disinfecting and/or  
sanitizing a surface or an article contaminated with  
undesired bacterial, viral and/or fungal organisms. In  
said method, the aforementioned diluted compositions,  
15 containing at least a sanitizing or disinfecting amount of  
the germicidal quaternary ammonium halide compound, is  
contacted with said contaminated surface or article in a  
fashion so as to suitably sanitize or disinfect same.  
Typically, said compositions will contain, on a total  
composition weight basis, at least about 0.01 weight  
20 percent (preferably about 0.02 weight percent or more)  
of the germicidal quaternary ammonium halide compound  
for sanitizing purposes and at least about 0.05 (prefer-  
ably at least about 0.07) weight percent of same for  
disinfectant end-use applications.

25 In a particularly preferred embodiment of the  
present invention, the weight ratio of the germicidal  
quaternary ammonium halide compound to the glycoside  
surfactant will be at least about 1:1. Preferably the  
weight ratio of the germicidal quaternary ammonium  
30 halide compound to the glycoside surfactant will general-  
ly be within the range of from about 1:1 to about 10:1  
(most preferably from about 1:1 to about 2:1).

DETAILED DESCRIPTION OF THE INVENTION

Germicidal quaternary ammonium halide compounds suitable for use in the present invention include higher (e.g.  $C_8 - C_{22}$ ) alkyl trimethyl ammonium halides; higher alkyl dimethyl benzyl ammonium halides; mixed higher alkyl (e.g., mixed  $C_{14}$ ,  $C_{16}$ ,  $C_{12}$  and  $C_{18}$  alkyl) dimethyl benzyl ammonium halides; twin long-chain (e.g.,  $C_{8-22}$ ) dialkyl dimethyl ammonium halides such as didecyl dimethyl ammonium halides, dioctyl dimethyl ammonium halides, etc.; lower (e.g.,  $C_{1-6}$ ) alkylsubstituted benzyl quaternaries such as higher alkyl dimethyl ethylbenzyl ammonium halides; and the like.

Glycoside surfactants suitable for use in the practice of the present invention include those of the formula:



wherein R is a monovalent organic radical (e.g., a monovalent saturated aliphatic, unsaturated aliphatic or aromatic radical such as alkyl, hydroxyalkyl, alkenyl, hydroxyalkenyl, aryl, alkylaryl, hydroxyalkylaryl, arylalkyl, alkenylaryl, arylalkenyl, etc.) containing from about 6 to about 30 (preferably from about 8 to about 18 and more preferably from about 9 to about 13) carbon atoms; R' is a divalent hydrocarbon radical containing from 2 to about 4 carbon atoms such as ethylene, propylene or butylene (most preferably the unit  $(R'O)_y$  represents repeating units of ethylene oxide, propylene oxide and/or random or block combinations thereof); y is a number having an average value of from 0 to about 12; Z represents a moiety derived from a reducing saccharide containing 5 or 6 carbon atoms (most

preferably a glucose unit); and x is a number having an average value of from 1 to about 10 (preferably from 1 to about 5 and most preferably from 1 to about 3).

Glycoside surfactants of the sort mentioned above, and various preferred subgenera thereof, are fully discussed in U. S. Patent 4,483,779 to Llenado et al. (issued November 20, 1984), the discussion and description of which is hereby incorporated by reference.

Glycoside surfactants suitable for use herein also include those of the formula I above in which one or more of the normally free (i.e., unreacted) hydroxyl groups of the saccharide moiety, Z, have been alkoxylated (preferably, ethoxylated or propoxylated) so as to attach one or more pendant alkoxy or poly (alkoxy) groups in place thereof. In such instance, the amount of alkylene oxide (e.g., ethylene oxide, propylene oxide, etc.) employed will generally correspond to from about 1 to about 20 (preferably from about 3 to about 10) moles thereof per mole of saccharide moiety.

In glycosides of the formula I above, the  $RO(R'O)_y$  group is generally bonded or attached to the number 1 carbon atom of the saccharide moiety, Z. Accordingly, the free hydroxyls available for alkoxylation are typically those in the number 2, 3, 4 and 6 positions in 6-carbon atom saccharides and those in the number 2, 3 and 4 positions in 5-carbon atom saccharide species. Typically, the number 2 position hydroxyl in 5-carbon saccharides, and the number 2 and 6 position hydroxyls in 6-carbon saccharides, are

substantially more reactive or susceptible to alkoxylation than those in the number 3 and 4 positions. Accordingly, alkoxylation will usually occur in the former locations in preference to the latter. Examples of the indicated alkoxyated glycoside materials, and of methodology suitable for the preparation of same, are described in United States patent application Serial No. 06/704,828 filed February 22, 1985 by Roth et al. (a copy of which is included in the file of the present application).

Glycoside surfactants of particular interest for use in the practice of the present invention preferably have a hydrophilic-lipophilic balance (HLB) in the range of from about 10 to about 18 and most preferably in the range of from about 12 to about 14.

Water soluble detergent builders suitable for use herein include the various water soluble alkali metal, ammonium or substituted ammonium phosphates, polyphosphates, phosphonates, polyphosphonates, carbonates, silicates, borates, polyhydroxysulfonates, polyacetates, carboxylates, and polycarboxylates. Preferred are the alkali metal, especially sodium, salts of the above.

Specific examples of suitable water soluble inorganic phosphate builders are sodium and potassium tripolyphosphate, pyrophosphate, polymeric metaphosphate having a degree of polymerization of from about 6 to 21, and orthophosphate. Examples of polyphosphonate builders are the sodium and potassium salts of ethylene-1,1-diphosphonic acid, the sodium and potassium salts of ethane-1,1,2-triphosphonic acid.

Examples of suitable water soluble nonphosphorus, inorganic builders for use herein include sodium and potassium carbonate, bicarbonate, sesquicarbonate, tetraborate decahydrate, and silicate having a molar ratio of  $\text{SiO}_2$  to alkali metal oxide of from about 0.5 to about 4.0, preferably from about 1.0 to about 2.4.

Water soluble, nonphosphorus organic builders useful herein also include the various alkali metal, ammonium and substituted ammonium polyacetates, carboxylates, polycarboxylates and polyhydroxy-sulfonates. Examples of polyacetate and polycarboxylate builders include the sodium, potassium, lithium, ammonium and substituted ammonium salts of ethylenediamine tetraacetic acid, nitrilotriacetic acid, oxydisuccinic acid, mellitic acid, benzene polycarboxylic acids, and citric acid.

Polycarboxylate builders suitable for use herein also include those set forth in U. S. Patent No. 3,308,067, Diehl, issued March 7, 1967 incorporated herein by reference. Such materials include the water-soluble salts of homo- and copolymers of aliphatic carboxylic acids such as maleic acid, itaconic acid, mesaconic acid, fumaric acid, aconitic acid, citraconic acid and methylenemalonic acid.

Other builders include the carboxylated carbohydrates of U. S. Patent 3,723,322 Diehl incorporated herein by reference.

Other useful builders herein include sodium and potassium carboxymethyloxymalonate, carboxymethyloxysuccinate, cis-cyclohexanehexacarboxylate, cis-cyclo-



pentanetetracarboxylate, phloroglucinol trisulfonate, water-soluble polyacrylates (having molecular weights of  
5 from about 2,000 to about 200,000 for example), and the copolymers of maleic anhydride with vinyl methyl ether or ethylene.

Other suitable polycarboxylates for use herein include the polyacetal carboxylates described in U. S.  
10 Patent 4,144,226, issued March 13, 1979 to Crutchfield et al and U. S. Patent 4,146,495, issued March 27, 1979 to Crutchfield et al both incorporated herein by reference.

Organic builders of the type described in Published European Patent Application EP-A-150,930  
15 can also be suitably employed in the compositions of the present invention.

Preferred water soluble detergent builders for use herein include ethylene diamine tetraacetic acid or the alkali metal salts thereof, tetrapotassium pyrophosphate and sodium carbonate. Of these ethylene diamine  
20 tetraacetic acid and its alkali metal salts are especially preferred.

Water miscible organic solvents suitable for use in the compositions of the present invention include  
25 alkylene glycols and/or ethers thereof (e.g., mono-lower alkyl,  $C_1$  to  $C_6$ , ethers thereof) such as, for example, ethylene glycol mono-n-butyl ether, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol mono-n-hexyl ether, propylene glycol  
30 monomethyl ether, propylene glycol monoethyl ether, isopropylene glycol monoethyl or monopropyl or monobutyl ether, etc; polyalkylene glycols and/or ethers

thereof (e.g. mono-lower alkyl, C<sub>1</sub> to about C<sub>6</sub>, ethers thereof) such as, for example, diethylene glycol  
5 monoethyl or monopropyl or monobutyl ether, di- or tripropylene glycol monomethyl ether, di- or tripropylene glycol monoethyl ether, etc.; t-butyl alcohol; tetrahydrofurfuryl alcohol; N-methyl-2-pyrrolidone; and the like.

10 As has been noted above, the compositions of the present invention can also, if desired in a given instance, suitably include one or more of the various known types of supplemental or auxiliary ingredients or additives such as, for example, hydrotropes (e.g.,  
15 water soluble salts of low molecular weight organic acids such as the sodium or potassium salts of toluene-, benzene-, xylene-, or cumene sulfonic acid, sodium or potassium sulfosuccinate, etc.); perfumes; dyes or colorants; thickeners and/or soil suspending agents  
20 (e.g., carboxymethyl cellulose, sodium polyacrylate, polyethylene glycols having molecular weights of from about 400 to about 100,000); deodorizers; ammonia; antioxidants; aerosol propellants; and the like. Typically, such supplemental or auxiliary ingredients will be  
25 employed in relatively minor proportions.

In the preparation of the aqueous disinfectant and/or sanitizing cleaner compositions hereof, there is typically no particular criticality associated with the order of ingredient addition or the technique employed in  
30 manufacturing or formulating same and such can therefore be accomplished in any fashion that may be convenient or expedient under the circumstances to provide

the subject composition of interest in the form of a stable, homogeneous aqueous solution thereof.

5           As has been noted above, the compositions of the present invention, if desired, can suitably be initially formulated, transported, distributed and/or marketed in the form of a dilutable aqueous concentrate composition and, in such event, can be diluted to the  
10           ultimately desired, end-use active ingredient strength by the eventual end-user or by a distributor at the retail or wholesale level. Alternatively, the compositions hereof can also suitably be initially and directly manufactured or formulated, transported, and marketed in  
15           their diluted, ready-to-use form as previously described in accordance with the present invention.

          In evaluating the relative cleaning effectiveness of the subject cleaning/disinfecting and/or cleaning/sanitizing compositions, it is convenient to  
20           employ a Gardner Washability Apparatus (using a standard soil tile and at standard pressure and sponge stroke settings), to determine or quantify the cleaning efficiency of a given composition of interest. In determining the cleaning efficiency, reflectance values  
25           are determined using a Gardner Lab Scan Reflectometer for each of the following: a clean unsoiled panel, a soiled panel and a soiled panel following washing or scrubbing with a Gardner Washability Apparatus. Such reflectance values are then employed to calculate %  
30           cleaning efficiency according to the following formula:

$$\% \text{ cleaning efficiency} = \frac{R_w - R_s}{R_o - R_s} \times 100\%$$

wherein:

- 5           Rw = Reflectance of the washed tile or panel  
          Rs = Reflectance of the soiled tile or panel  
          and Ro = Reflectance of the clean, unsoiled tile or panel.

10           The disinfecting and/or sanitizing effectiveness  
of the compositions of the present invention can be  
conveniently determined in accordance with the  
Association of Official Analytical Chemists (AOAC) Use  
Dilution Test as described in the Official Method of  
Analysis of the Association of Official Analytical  
Chemists, 13th Edition, Washington D.C., 1980, page 58.

15           The present invention is further illustrated  
and understood by reference to the following examples  
thereof in which all parts and percentages are on a  
weight basis unless otherwise indicated.

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EXAMPLES 1 and 2

5 In these examples, the aqueous disinfectant cleaner compositions described in Table I below are prepared and are evaluated as to their disinfecting and cleaning effectiveness in accordance with the test procedures described above.

10 The formulations of Examples 1 and 2 each employ a glycoside surfactant and are within the scope of the present invention. Controls 1 and 2 employ a commercially available ethoxylated nonylphenol nonionic surfactant (9.5 mole ethylene oxide per mole of nonylphenol) in place of the glycoside surfactant and are  
15 presented and evaluated for comparative purposes.

The results of the cleaning efficiency and disinfectant effectiveness evaluations are summarized in Table I.

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TABLE I

<u>Ingredients</u> <sup>1</sup>	<u>Example 1</u>	<u>Control 1</u>	<u>Example 2</u>	<u>Control 2</u>
Quaternary Ammonium Halide <sup>2</sup>	4.5	4.5	4.5	4.5
Glycoside Surfactant <sup>3</sup>	4.5	None	4.5	None
Conventional Nonionic Surfactant <sup>4</sup>	None	4.5	None	4.5
Na <sub>2</sub> CO <sub>3</sub>	3.0	3.0	3.0	3.0
EDTA <sup>5</sup>	2.85	2.85	None	None
Tetra Potassium Pyrophosphate	None	None	2.0	2.0
Water	<u>85.15</u>	<u>85.15</u>	<u>86.0</u>	<u>86.0</u>
TOTAL	100.0	100.0	100.0	100.0
% CLEANING EFFICIENCY <sup>6</sup>	24.9%	10.7%	7.3%	14.3%
DISINFECTANT EFFECTIVENESS <sup>6</sup>	Pass	Pass	Pass	Pass

1. Ingredients stated in parts by weight and on an active ingredient only basis.
2. Quaternary Ammonium Halide = 1:1 weight ratio mixture of (a) n-alkyl (C<sub>14</sub> = 60%, C<sub>16</sub> = 30%, C<sub>12</sub> = 5% and C<sub>18</sub> = 5%) dimethyl benzyl ammonium chloride and (b) n-alkyl (C<sub>12</sub> = 50%, C<sub>14</sub> = 30%, C<sub>16</sub> = 17% and C<sub>18</sub> = 3%) dimethyl ethylbenzyl ammonium chloride.
3. Glycoside Surfactant = alkyl (C<sub>12</sub>-C<sub>13</sub>) polyglucoside (degree of polymerization = 3.0).
4. Conventional Nonionic Surfactant = Ethoxylated nonylphenol (9.5 moles ethylene oxide per mole of nonylphenol).
5. EDTA = Tetrasodium salt of ethylene diamine tetraacetic acid.
6. Diluted 1 part formulation:64 parts water (703 ppm of quaternary ammonium halide) for disinfectant effectiveness testing and for cleaning effectiveness testing.

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While the present invention has been described  
and illustrated by reference to certain specific embodi-  
5 ments and examples thereof, such is not to be inter-  
preted as in any way limiting the scope of the instantly  
claimed invention.

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WHAT IS CLAIMED IS:

1. A liquid disinfectant and/or sanitizing cleaner composition which, on a total composition weight basis, comprises:
  - a. from about 0.01 to about 50 weight percent of a germicidal quaternary ammonium halide compound;
  - b. from about 0.01 to about 50 weight percent of a glycoside surfactant; and
  - c. from about 10 to about 99.98 weight percent water; and in which the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 0.65:1.
2. The composition of claim 1 in the form of a dilutable liquid concentrate in which, on a total composition weight basis:
  - a. the germicidal quaternary ammonium halide compound constitutes from about 10 to about 50 weight percent;
  - b. the glycoside surfactant constitutes from about 10 to about 50 weight percent; and
  - c. water constitutes from about 10 to about 80 weight percent.



3. The composition of claim 2 in which a water soluble detergent builder is present in an amount of from about 10 to about 50 weight percent on a total composition weight basis.
4. The composition of claim 1 in the form of a dilutable liquid concentrate in which, on a total composition weight basis:
  - a. the germicidal quaternary ammonium halide compound constitutes from about 10 to about 30 weight percent;
  - b. the glycoside surfactant constitutes from about 10 to about 30; and
  - c. water constitutes from about 10 to about 80 weight percent.
5. The composition of claim 4 in which a water soluble detergent builder is present in an amount of from about 10 to about 30 weight percent on a total weight basis.
6. The composition of claim 1 in the form of a ready to use sanitizing and/or disinfectant cleaning composition in which, on a total composition weight basis:
  - a. the germicidal quaternary ammonium halide compound constitutes from about 0.01 to about 10 weight percent;

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- b. the glycoside surfactant constitutes from about 0.01 to about 10 weight percent; and
  - c. water constitutes from about 50 to about 99.98 weight percent.
7. The composition of claim 6 in which a water soluble detergent builder is included therein in an amount of from about 0.01 to about 10 weight percent on a total composition weight basis.
8. The composition of any one of claims 3, 5 or 7 wherein the water soluble detergent builder is selected from the group consisting of ethylene diamine tetraacetic acid or alkali metal salts thereof, tetrapotassium pyrophosphate and sodium carbonate.
- 5
9. The composition of any one of claims 1 to 8 wherein the ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 1:1.
10. A method of sanitizing a hard surface which comprises applying thereto a liquid sanitizing cleaning composition which on a total composition weight basis, comprises:
- 5
- a. from about 0.01 to about 10 weight percent of a germicidal quaternary ammonium halide compound;

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- b. from about 0.01 to about 10 weight percent of a glycoside surfactant; and
- c. from about 50 to about 99.98 weight percent water; and in which the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 0.65:1.

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- 11. A method of disinfecting a hard surface which comprises applying thereto a liquid disinfectant cleaning composition which, on a total composition weight basis, comprises:

- a. from about 0.05 to about 10 weight percent of a germicidal quaternary ammonium halide compound;
- b. from about 0.01 to about 10 weight percent of a glycoside surfactant; and

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- c. from about 50 to about 99.94 weight percent water; and in which the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 0.65:1.

- 12. The method of claim 10 or 11 wherein a water soluble detergent builder is employed in an amount of from about 0.01 to about 10 weight percent on a total composition weight basis and is selected from

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the group consisting of ethylene diamine tetraacetic acid or alkali metal salts thereof, tetrapotassium pyrophosphate and sodium carbonate.

13. The method of claim 12 wherein the water soluble detergent builder is ethylene diamine tetraacetic acid or an alkali metal salt thereof.
14. The method of any one of claims 11 through 13 wherein the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 1:1.

## AMENDED CLAIMS

[received by the International Bureau on 10 June 1986 (10.06.86);  
original claims 1-13 replaced by new claims 1-8 (5 pages)]

1. A liquid disinfectant and/or sanitizing cleaner composition which, on a total composition weight basis, comprises:
  - a. from about 0.01 to about 50 weight percent of a germicidal quaternary ammonium halide compound;
  - b. from about 0.01 to about 50 weight percent of a glycoside surfactant;
  - c. from about 0.01 to about 50 weight percent of ethylene diamine tetraacetic acid or an alkali metal salt thereof; and
  - d. from about 10 to about 99.98 weight percent water; and in which the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 0.65:1.
2. The composition of claim 1 in the form of a dilutable liquid concentrate in which, on a total composition weight basis:
  - a. the germicidal quaternary ammonium halide compound constitutes from about 10 to about 50 weight percent;

- b. the glycoside surfactant constitutes from about 10 to about 50 weight percent;
  - c. the ethylene diamine tetraacetic acid or alkali metal salt thereof constitutes from about 10 to about 50 weight percent; and
  - d. water constitutes from about 10 to about 80 weight percent.
3. The composition of claim 1 in the form of a dilutable liquid concentrate in which, on a total composition weight basis:
- a. the germicidal quaternary ammonium halide compound constitutes from about 10 to about 30 weight percent;
  - b. the glycoside surfactant constitutes from about 10 to about 30;
  - c. the ethylene diamine tetraacetic acid or alkali metal salt thereof constitutes from about 10 to about 30 weight percent; and
  - d. water constitutes from about 10 to about 80 weight percent.
4. The composition of claim 1 in the form of a ready to use sanitizing and/or disinfectant cleaning composition in which, on a total composition weight basis:

- a. the germicidal quaternary ammonium halide compound constitutes from about 0.01 to about 10 weight percent;
  - b. the glycoside surfactant constitutes from about 0.01 to about 10 weight percent;
  - c. the ethylene diamine tetraacetic acid or alkali metal salt thereof constitutes from about 0.01 to about 10 weight percent; and
  - d. water constitutes from about 50 to about 99.98 weight percent.
5. The composition of any one of claims 1 to 4 wherein the ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 1:1.
6. A method of sanitizing a hard surface which comprises applying thereto a liquid sanitizing cleaning composition which on a total composition weight basis, comprises:
- a. from about 0.01 to about 10 weight percent of a germicidal quaternary ammonium halide compound;
  - b. from about 0.01 to about 10 weight percent of a glycoside surfactant;

- c. from about 0.01 to about 10 weight percent of ethylene diamine tetraacetic acid or an alkali metal salt thereof; and
  - d. from about 50 to about 99.98 weight percent water; and in which the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 0.65:1.
- 7. A method of disinfecting a hard surface which comprises applying thereto a liquid disinfectant cleaning composition which, on a total composition weight basis, comprises:
  - a. from about 0.05 to about 10 weight percent of a germicidal quaternary ammonium halide compound;
  - b. from about 0.01 to about 10 weight percent of a glycoside surfactant;
  - c. from about 0.01 to about 10 weight percent of ethylene diamine tetraacetic acid or an alkali metal salt thereof; and
  - d. from about 50 to about 99.94 weight percent water; and in which the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 0.65:1.



8. The method of any one of claims 6 or 7 wherein the weight ratio of the germicidal quaternary ammonium halide compound to the glycoside surfactant is at least about 1:1.

# INTERNATIONAL SEARCH REPORT

International Application No PCT/US86/00486

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>3</sup> According to International Patent Classification (IPC) or to both National Classification and IPC U.S. Cl. 422/37, 252/106, 174.17, 528, 547 IPC (4): C11D: 1/62; 1/66; 1/835; 3/22, A01N: 33/02																																									
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Minimum Documentation Searched <sup>4</sup></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; text-align: left; border-bottom: 1px solid black;">Classification System</th> <th style="text-align: left; border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">U.S.</td> <td style="padding: 5px;">422/37, 252/106, 174.17, 528, 547</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup></div>			Classification System	Classification Symbols	U.S.	422/37, 252/106, 174.17, 528, 547																																			
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<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; text-align: left; border-bottom: 1px solid black;">Category <sup>*</sup></th> <th style="text-align: left; border-bottom: 1px solid black;">Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup></th> <th style="text-align: left; border-bottom: 1px solid black;">Relevant to Claim No. <sup>18</sup></th> </tr> <tr> <td style="vertical-align: top; padding: 5px;">Y</td> <td style="vertical-align: top; padding: 5px;">US, A, 3,717,630 (Booth] 20 February 1973 See columns 11 and 12</td> <td style="vertical-align: top; padding: 5px;">1-14</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">A</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,203,872 (Flanagan] 20 May 1980</td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">Y</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,259,217 (Murphy] 31 March 1981 See columns 23 and 24.</td> <td style="vertical-align: top; padding: 5px;">1-14</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">A</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,264,479 (Flanagan] 28 April 1981</td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">Y</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,336,152 (Like et al] 22 June 1982 See column 2, lines 47-58 and Example 2.</td> <td style="vertical-align: top; padding: 5px;">1-14</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">A</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,443,363 (Klinger et al] 17 April 1984</td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">A</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,443,364 (Klinger et al] 17 April 1984</td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">A</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,455,250 (Frazier) 19 June 1984</td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">X</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,493,773 (Cook et al] 15 January 1985 See the entire document.</td> <td style="vertical-align: top; padding: 5px;">1-14</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">A,P</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,540,505 (Frazier] 10 September 1985</td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">A,P</td> <td style="vertical-align: top; padding: 5px;">US, A, 4,544,494 (Downey et al] 01 October 1985</td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">X</td> <td style="vertical-align: top; padding: 5px;">EP, B, 0-106-692 (Jones) 25 April 1984 See the entire document.</td> <td style="vertical-align: top; padding: 5px;">1-14</td> </tr> </table>			Category <sup>*</sup>	Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>	Y	US, A, 3,717,630 (Booth] 20 February 1973 See columns 11 and 12	1-14	A	US, A, 4,203,872 (Flanagan] 20 May 1980		Y	US, A, 4,259,217 (Murphy] 31 March 1981 See columns 23 and 24.	1-14	A	US, A, 4,264,479 (Flanagan] 28 April 1981		Y	US, A, 4,336,152 (Like et al] 22 June 1982 See column 2, lines 47-58 and Example 2.	1-14	A	US, A, 4,443,363 (Klinger et al] 17 April 1984		A	US, A, 4,443,364 (Klinger et al] 17 April 1984		A	US, A, 4,455,250 (Frazier) 19 June 1984		X	US, A, 4,493,773 (Cook et al] 15 January 1985 See the entire document.	1-14	A,P	US, A, 4,540,505 (Frazier] 10 September 1985		A,P	US, A, 4,544,494 (Downey et al] 01 October 1985		X	EP, B, 0-106-692 (Jones) 25 April 1984 See the entire document.	1-14
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<sup>*</sup> Special categories of cited documents: <sup>15</sup> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family																																							
<b>IV. CERTIFICATION</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of the Actual Completion of the International Search <sup>1</sup>             01 May 1986         </td> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of Mailing of this International Search Report <sup>1</sup>   <div style="text-align: center; font-size: 1.2em;">30 MAY 1986</div> </td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">           International Searching Authority <sup>1</sup>   <div style="text-align: center; font-size: 1.2em;">ISA/US</div> </td> <td style="border-bottom: 1px solid black; padding: 5px;">           Signature of Authorized Officer <sup>20</sup>  <div style="text-align: center;">              L. Kummert           </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <sup>1</sup>  01 May 1986	Date of Mailing of this International Search Report <sup>1</sup>  <div style="text-align: center; font-size: 1.2em;">30 MAY 1986</div>	International Searching Authority <sup>1</sup>  <div style="text-align: center; font-size: 1.2em;">ISA/US</div>	Signature of Authorized Officer <sup>20</sup> <div style="text-align: center;">              L. Kummert           </div>																																			
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## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

A N, Soap/Cosmetics/Chemical Specialties for August 1980 (Greene et al) "Formulating Quaternary Cleaner Disinfectants to Meet EPA Requirements"

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE <sup>10</sup>

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers ..... because they relate to subject matter <sup>12</sup> not required to be searched by this Authority, namely:

2. ☐ Claim numbers ..... because they relate to parts of the International application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out <sup>13</sup>, specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING <sup>11</sup>

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

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